



United States Department of the Interior

U.S. GEOLOGICAL SURVEY

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SEP 20 1995

September 19, 1995

Mr. Lester Snow, Executive Director
CALFED Bay-Delta Program
1416 Ninth Street, Suite 1155
Sacramento, California 95814

Dear Mr. Snow:

This letter elaborates on a point discussed in the CALFED workshop on Thursday, September 14. Exclusion of most of San Francisco Bay from the CALFED area of direct concern surprised me because you include the bay in your name. I think that CALFED would be wise to include San Francisco Bay because of the physical, chemical, and biological linkages between the bay and delta. Some of the known linkages, including some that you mentioned in the workshop, are:

Comments

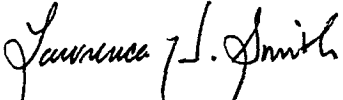
- o Dredging in San Francisco Bay is a necessary activity in support of the bay area economy. The Corps of Engineers' Baldwin Ship Channel project proposes to deepen the ship channel in the northern reach of the bay. The potential for resultant increases in ocean salinity in the northern reach, and amounts of additional fresh water needed from the delta to counteract any increases, are important issues to be resolved.
- o The seasonal evolution of the salinity distribution in the bay and project operations are linked. Two years with equal annual delta outflow that begin with similar salinity distributions can have different final distributions if the timing of outflows differs (Peterson and Cayan, 1989). Thus proposed alterations of project operations might alter bay salinity distributions significantly, which in turn, would alter project operations.
- o Although the location of the 2 PSU bottom salinity (the management quantity X2) usually resides within Suisun Bay, at least some of the source areas for the suspended sediment and organisms in this area are seaward of Suisun Bay. During runoff events these source areas extend as far seaward as the coastal

ocean, when larvae of estuarine and marine macroinvertebrates and fish are transported into the bay from the coastal ocean (Armor and others, 1991; Department of Fish and Game, 1992; Hieb and Baxter, 1993; Hieb and Baxter, 1994). These organisms subsequently use the bay as rearing habitat. The interactions of these species with the anadromous and resident species of concern is unknown, and the importance of this transport mechanism to adults of the species of concern is unknown.

- o The accidental introduction of new species continues to alter the assemblage of species in the bay and delta (Nichols and others, 1986; Carlton and others, 1990). The consequences of these alterations for anadromous fish that use the bay are unknown. This uncertainty makes evaluation of delta effects more difficult.
- o Field concentration data and laboratory bioassays indicate that some pesticides applied in the Central Valley and delta are transported to San Francisco Bay at concentrations toxic to test organisms (Kuivila, 1993; Kuivila and Foe, 1995). Ongoing studies are attempting to determine if toxic concentrations lead to demonstrable effects on populations. River flows and delta diversions and exports are important factors in transport and degradation of the pesticides.
- o Phytoplankton blooms in South San Francisco Bay are known to result from stratification of the water column that results from spring runoff from the delta (Cloern, 1984). In addition, the build-up of trace metals in the benthic community of South Bay may be proportional to the length of the period of the year without runoff events from the delta (Luoma and others, 1985). The timing of runoff influences the length of this period. Finally, spawning of herring in South Bay is thought to depend on the presence of brackish surface water (Cherr, 1994). The delta is the main source of fresh water for these areas.

While these linkages may seem of secondary importance at present, they were addressed in State Water Board Decision 1485 and were considered by the Board in its hearings during the late 1980s. I suspect that future changes in the bay will reemphasize the importance of these linkages, and that evaluating proposed alternatives will be difficult without considering their consequences for the bay. Thus I suggest that CALFED consider including the bay as a part of its area of primary concern. Otherwise I think that the long-term success of bay-delta agreements may be vulnerable to ecological and physical changes in the bay.

Sincerely yours,


Lawrence H. Smith
Hydrologist

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